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Noted 17 Aug 49

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ELINT

GAINS, LOSSES, AND EXPECTATIONS

10 - 14 August

Remaining Lectures of the Preview:

25X1 1. [redacted] submitted a good outline of his lecture on organization and talked briefly on it. There is no need for worry about this talk. On Friday I talked with [redacted] 25X1 about what he should say on NSA. Changes in organization of NSA have been so frequent that he is going to put together some charts of his own and submit them on 18 August. I had made an outline of the main topics of his speech since he seemed somewhat uncertain of what he should say; he accepted it. Mr. 25X1 [redacted] is to talk on the informal organization that now exists within the community, i.e., on how things get done. I have yet to discuss the matter with him.

2. Despite everybody's fears, the panel on requirements went off amiably but not satisfactorily. [redacted] did not get 25X1 down to his topic: the intelligence objectives; [redacted] did 25X1 not get at the meat of his subject, which should be the intent of OSI to write requirements whose purpose is plain to the DDP--he ignored, for example, the writing of the requirements on [redacted] 25X1 which is dramatic in itself and answers to all the objections of 25X1 the DDP. [redacted] was the only one who had a very clear idea of what he wanted to say. This vagueness I shall have to overcome by making a series of synopses that are a combination of what has been said and what ought to be said, and getting the speakers to accept them.

25X1 3. [redacted], who will represent TSS, I introduced him to
25X1 [redacted] demonstrated the
25X1 black box to [redacted] and discussed methods of concealment.
25X1 [redacted] will lecture at [redacted] and will also be present 25X1
in the black box problems in the third week.

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NO CHANGE in Class. ☐
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By [redacted] Date [redacted]

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Basic Documents and Case Histories:

4. NSCID #6 is the basic charter of ELINT. I have been unsuccessful in getting a copy for the course. Prolonged negotiations led from [redacted] its special guardian in OCI, to the Assistant Director himself, and finally to his deputy, [redacted] said that the document was so delicately worded that it could not be given to students. He did, however, offer to send over a man to brief the class on it. I in turn suggested that [redacted] do the job. [redacted] agreed and will consult with [redacted]

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5. While the new COMINT regulations do soften restrictions in certain particulars, they do not affect the relationship of ELINT and COMINT.

6. [redacted] of Operational Aids had only one aid applicable to ELINT and that is dated 1956. He is sending over 15 copies. I found out from [redacted] of OC that Commo wrote up a special ELINT operation that is now with OSI. I have a series of leads into OSI toward finding it. [redacted] of Staff D promised that he would see what he had in his files. Mr. [redacted] said that he would be glad to take ELINT materials turned over to him and put them into the regular format of operational aids. He also said that he thought his staff could get the job done by 6 October.

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7. The glossary is getting slow accretions. I am trying to farm out the new words to various sections for definitions. An immediate difficulty is that there are no authoritative sources for some of the words.

8. I am trying to run down an Air Force map of pinpointed [redacted] targets that [redacted] mentioned and think that I have located copies in OCR.

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9. The ELINT Review, put out by NTPC, contains in an appendix a list of the nicknames of all radars thus far discovered, together with parameters and brief descriptions. I have asked through OSI for 15 copies of the appendix.

Administration:

10. I talked with a [redacted] who had just returned from an orientation tour of Cape Canaveral. He described the OC operation, a separate monitoring establishment outside the reservation to which students could be admitted without undue notice being

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called to them. He said the final equipment was now being installed and should be fully ready by 6 October. He also made an admirable suggestion: that students take signals on the black box to get some idea of its limitations on telemetry signals.

25X1 11. [redacted] said that he thought the plane could be chartered without difficulty; it would cost about a $1000 dollars for the round trip if the plane left one night and came back to its Washington port on the third night to be ready for operations the next day. [redacted] is away but I will brace him for funds when he returns.

Deus ex Machina:

25X1 12. On Friday, [redacted] reported that [redacted] 25X1
25X1 Chief of [redacted] had said positively that all students should have COMINT clearance. I proposed that for this first course we recruit our students one by one, check them out in personal interviews, and make no formal announcement of the course by bulletin. I talked this matter over with [redacted] in the afternoon and 25X1
he seemed to think the method was feasible. [redacted] on his 25X1
staff started immediately to make calls among the divisions. We can get the students, I feel confident, but we cannot get them all at the case officer level. I have no objection to pulling a few from the FI staff, provided they have, at that level, some connection with ELINT.

Summary:

13. There is a New England phrase that exactly describes the present situation: I have a lot of hay down and thunderstorms are in the offing.

[redacted] 25X1

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TECHNICAL WORDS COMMONLY USED IN ELECTRONIC INTERCEPT

Accelerometer: An instrument for measuring one or more components of the acceleration (change in velocity) of a missile. WHAT MAKES GUIDED MISSILES TICK? American Electronics Co. AEC

Aerodynamics: The branch of science dealing with the movement of air and other gases. WHAT MAKES GUIDED MISSILES TICK? American Electronics Co. AEC

Amplifier: A device for increasing the magnitude of the output of an electrical or mechanical system, as in radio, pneumatic, audio, and hydraulic systems. WHAT MAKES GUIDED MILLISES TICK? American Electronics Co. AEC

Amplitude: The maximum instantaneous value of an alternating voltage or current, measured in either the positive or negative direction. Also used in regard to the height of a pulse. Manual In Intercept Operations (Familiarization with ELINT operations) Dec. 1957. Air Force Special Communications CH. MIO.

Amplitude Modulation (AM): A method by which the amplitude of a constant radio frequency wave is made to vary in accordance with a signal containing intelligence. MIO

Antenna gain: A measure of the degree to which an antenna radiation pattern is unidirectional. MIO.

Apogee: The position of the moon in its orbit when it is furthest away from the earth. AEC.

Artificial Satellite: A man-made moon which moves in an orbit about the earth or another planet after having been placed in the orbit by a rocket or other device. AEC.

Attenuator: A device which causes a loss in energy of a system without introducing appreciable distortion in the desired system output. AEC.

Attitude: The position of a missile with respect to the earth or horizon. AEC.

Audio frequency: A frequency within the range of sound frequencies which can be detected by the human ear. The range of audio frequencies extends from approximately 20 to 20,000 cycles per second. MIO

Ballistic Missile: A missile whose flight path from termination of thrust to impact has essentially zero lift. It is subjected to gravitation and drag, and may or may not perform manuvers to modify or correct the flight path. AEC.

Bandwidth: The difference in frequencies between the lowest and highest frequency of a circuit, such as a tuned circuit, modulated radio signal, radio or television station channel assignment. AEC.

Band, Frequency: A continuous range of frequencies between upper and lower limiting frequencies. AEC.

Beam rider: A type of missile guidance in which the missile follows the center of a radar beam. MIO

Beam-width: The angular width of the main lobe of an antenna radiation pattern as measured between predetermined points on the lobe. MIO

Blip: A streak of light on a radar screen caused by disturbance in the path of the radar beam. AEC.

Booster: An auxiliary propulsion system which travels with the missile and which may or may not separate from the missile when its impulse has been delivered. AEC.

Breaking Orbit: The technique of using the earth's atmosphere to slow down a spaceship returning to the earth from outer space. The spaceship dives into the atmosphere then moves out of the atmosphere, a number of times - as a stone "skippin" on water - until the ship has slowed sufficiently to make a landing at reduced speed. AEC.

Cathode Ray Tube (CRT): A vacuum tube in which an electron beam is accelerated and focused in an electron gun. This electron beam is then made to strike a layer of fluorescent material which converts the electron energy into light energy. By inserting a changing field, either electric or magnetic, between the electron gun and the fluorescent screen, the electron beam may be deflected or moved in accordance with the field variations. MIO.

Center of Gravity: The point at which all the mass of a missile may be regarded as being concentrated so far as the motion of translation is concerned. AEC.

Channel: The band of frequencies within which a radio or television transmitter or receiver must maintain its modulated carrier signal. AEC.

Coaxial Line: A cable having concentric conductors. Used as a transmission line for audio, radio, radar, and television signals. AEC.

Computer: A device which performs mathematical calculations. AEC.

Conical Scanning: A radar scanning system wherein a point on the radar beam describes a circle at the base of a cone, and the axis is the generation of the cone. AEC.

Destructor: An explosive or other device for intentionally destroying a missile. AEC.

Dish Radar: The parabolic reflector which is part of certain radar antennas. AEC.

Doppler Effect: The apparent change in frequency of a sound or radio wave reaching an observer or a radio receiver, caused by a change in distance or range between the source and the observer or receiver during the interval of reception. AEC.

Early Warning (EW): The radar technique and equipment for long-range detection of enemy aircraft and/or surface vessels. MIO

Echo: The signal reflected by a distant target to a radar set. MIO.

ECM (Electronic Countermeasures): The measures taken to deny an enemy the intelligence normally obtainable from his control and warning systems. MIO.

Emission: The passage of electrons or energy from the surface of a material into the surrounding space due to action of heat, light cathode rays, chemical action or impact excitation. MIO.

Escape Velocity: The effective speed required to escape the gravitational pull of the earth of other planet. AEC.

Exhaust Velocity: The amount of fuel used per second in a rocket engine which employs a jet reaction. AEC.

Frequency Modulation (FM). The process of varying the frequency of a constant amplitude carrier wave in accordance with the amplitude and frequency variations of a modulating signal. MIO.

Frequency scanning: Type of system in which output or input frequency is made to vary at a mechanical rate over desired frequency band. MIO.

Gate: (1) In radar or control terminology, and arrangement to receive a signal only in a small, selected fraction of time of the total transmission. (2) Range of air-fuel ratios in which combustion can initiated. (3) In computer terminology, a device used to control passage of information through a circuit. AEC.

Gimbal: A mechanical frame containing two mutually perpendicular intersecting axes or rotating bearings and/or shafts. AEC.

Goddard, Robert A.: An American scientist who pioneered rocket engine research. One of the earliest rocket scientists to treat rocketry as a science, considered the "Father of American Rocketry". AEC.

Guidance, Celestial Navagation: A system in which the missile steers toward a target by means of observation of celestial bodies. A system wherein a missile, by suitable instrumentation and containing all necessary guidance equipment, may follow a predetermined course in space with reference primarily to the relative position of the missile and certain preselected celestial bodies. AEC.

Guidance, Command: A guidance system wherein intelligence transmitted to the missile from an outside source causes the missile to traverse a directed path in space. AEC.

Guidance: The entire process of determining the path of a missile and maintaining the missile on that path. AEC.

Guidance, Homing: A system in which the missile steers toward a target by means of radiation which the missile receives from the target, either be relection (radar or visible light) or by emission from the target (infra-red or acoustic - sound - energy). AEC.

Guided Missile: An unmanned vehicle moving above the earth's surface, whose trajectory or flight path is capable of being altered by a mechanism within the missile. AEC.

Gyroscope: A wheel or disc, mounted to spin rapidly about an axis and also free to rotate about one or both of two axis perpendicular to each other and the axis of its spin. A gyroscope exhibits the property of rigidity in space. AEC.

Horizontal polarization: Electric field (E vector) parallel to the horizon. An antenna in which the dipoles are horizontal is horizontally polarized. MIO.

ICBM: Intercontinental Ballistic Missile. A missile which has a range of approximately 5000 miles. AEC.

Intensity modulation: Reproduction of an image by the variation of the light output of a cathode ray tube in accordance with the signal. MIO

Ionosphere: That portion of the earth's atmosphere, beginning about 30 miles above the surface of the earth, consisting of layers of highly ionized gases capable of bending or reflecting certain radio waves back to the earth. AEC.

Jamming: Intentional transmission of radio frequency energy in such a way as to interfere with reception of signals by another transmitting station. AEC.

Jato: Jet assist take-off. An auxiliary rocket device for applying thrust to a missile. AEC.

Kilomegacycle (kmc): 1000 megacycles. MIO.

Light year: The distance light travels in one year. Approximately six trillion miles. AEC.

Lobe: Refers to the two or three dimensional polar representation used to indicate the distribution in space of antenna field strength intensities. MIO.

Lobe duration: The time measured between half-power points of the main lobe of an antenna which is rotating at a constant angular rate. MIO.

Mach Number: A method of measuring high speeds. The ratio of the velocity of a body to that of sound in the medium being considered. At sea level in air at the Standard U.S. Atmosphere, a body moving at a Mach number 1 (Mach 1) would have a velocity of approximately 1116.2 feet per second, the speed of sound in air under those conditions. AEC.

Missile: A self-propelled unmanned vehicle which travels above the surface of the earth. AEC.

Modulation: The variations in frequency, amplitude or phase of an r-f carrier which contains the information or signal being transmitted. MIO.

Orbit: The elliptical or circular path a celestial body assumes in motion about a larger body in space. The path described in any mechanical or natural celestial body which is fixed by its speed and mass. AEC.

Oscillograph: An apparatus for producing a graphic record representing the instantaneous values of a rapidly varying electric quantity as a function of time or of some other electric quantity. MIO.

Oscilloscope: An apparatus for showing visually on the screen of a cathode ray tube the waveform of a rapidly varying quantity such as an alternating voltage. MIO.

Parameter: n. 1. A constant having a series of particular and arbitrary values, each value characterizing a member in a system or family of expressions, curves, surfaces, functions, or the like. 2. transf. In psychological use, a criterion that has shifting values.

In sense I, for example, if one should draw a cross section of an airfoil with a chord of an arbitrary length, then by using the same chord extended, should draw a series of cross sections of additional airfoils, each determined in its proportions by the particular length of the chord used, the chord would be a parameter. Similarly, in a diagram of several circles, all centered upon the same point, the radii of these circles considered as a single radius having different values would be a parameter. Again, if a certain speed of an aircraft causes a certain wing flutter, and if a pattern of wing flutter can be ascertained by means of differences in speeds, then speed becomes a parameter. AFD.

Pulse: A momentary sharp change in a current voltage, followed almost immediately thereafter by a sharp return to normal. MIO.

Pulse amplitude: The magnitude of a pulse. MIO.

Pulse Amplitude Modulation (PAM): Modulation of a pulse train produced by varying the amplitude of succeeding pulses. MIO.

Pulse analyzer: A special oscilloscope used with a search receiver for the purpose of measuring the pulse repetition rate and pulse width of intercepted radar signals. MIO.

Pulse Duration (PD): The time interval required for the instantaneous amplitude of a pulse to rise from 10% of peak value to 100%, then fall back to 90% of peak value. Also pulse width (PW). MIO.

Radar: Radio detecting and ranging apparatus, based on the principle that ultra-high frequency radio waves travel at a definite speed and are reflected from objects they encounter. The waves are radiated as beams by a directional antenna array that can be swept through space at all angles. The elapsed time between transmission and reception of a wave pulse is measured electronically to give the distance or range to the reflecting object. The elevation and azimuth to the object correspond to the elevation and azimuth of the directional array at the time the pulse is received. MIO.

Radio frequency (r-f): Any frequency of electromagnetic energy capable of being propagated into space. Frequencies from 10 cs to 30,000 mc and higher. MIO.

Range: The number of miles between any two points, usually measured in yards or nautical miles. A nautical mile is 6080.27 feet, but for convenience in radar and navigation, the nautical mile is said to be 6000 feet, or 2000 yards long. The statute mile is 5280 feet long. MIO.

Rocket Acceleration: The steadily increasing speed of a rocket in space. AEC.

Scanning: 1. The process of directing the r-f beam successively over all points in a given region of space. 2. The process of deflecting the beam of a cathode ray tube to certain parts of the screen as a means of forming a pattern. MIO.

Scanning rate: The rate of repetition of the scanning cycle of a radar beam. MIO.

Selectivity: The degree to which a radio receiver is capable of receiving signals of one frequency or band of frequencies while at the same time discriminating against signals of all other frequencies. MIO.

Sensitivity: A measure of the ability of a receiver to amplify a signal. It is measured by the input signal required to produce a certain fixed output signal. The lower the input signal for a given output, the higher the sensitivity. MIO.

Telemetering: A remote-control method of defining conditions inside and around a missile in flight. Radio signals received at stations on the surface of the earth activate various meters and record the quantities measured on the missile. AEC.

Transducer: Any device that produces an electrical signal in response to some externally applied stimulus. Examples of a transducer are a microphone, phonograph pickup, photocell, thermocouple, etc. AEC.

Vanguard: U.S. rocket designed as a launching vehicle for MOUSE satellite. AEC.

Vertical polarization: Electric field (E vector) perpendicular to the horizon. An antenna in which the dipoles are vertical is vertically polarized. MIO.

Video: 1. A term used to include a wide band of frequencies extending from approximately 60 or 100 cycles per second out to several megacycles per second. 2. The output voltage of a detector, or the signal voltage applied to cathode ray indicator. MIO.

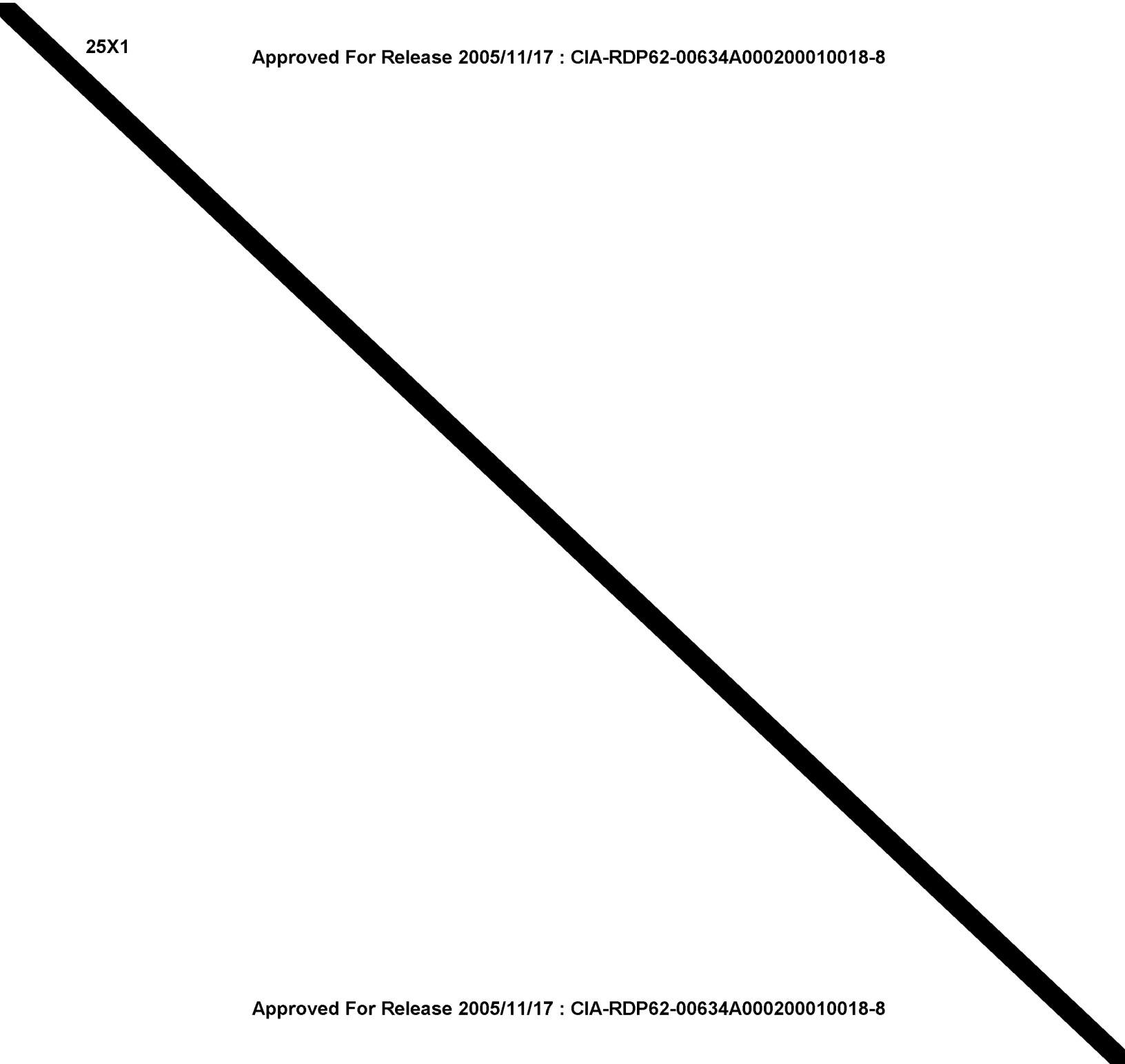
Viking: U.S. rocket based on V - 2 design. AEC.

Wavelength: The distance, usually expressed in meters, traveled by a wave during the time interval of one complete cycle. MIO.

AEC: American Electronics Co. WHAT MAKES GUIDED MISSILES TICK:

AFD: Woodford Agee Heflin, Editor, The United States Air Force Dictionary, Air University Press, 1956

MIO: Manual in Intercept Operations (Familiarization with ELINT operations) Dec. 1957: Air Force Special Communications Ch.



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